What is claimed is:

1. An etchant gas composition, comprising:
a carrier gas;
one or more $C_{2+}F$ gases;
CH_2F_2; and
a gas selected from the group consisting of CHF_3, CF_4, and mixtures thereof.

2. The etchant gas composition according to Claim 1, wherein the one or more $C_{2+}F$ gases comprises C_4F_8.

3. The etchant gas composition according to Claim 1, wherein the one or more $C_{2+}F$ gases is C_4F_8.

4. The etchant gas composition according to Claim 1, wherein the carrier gas is selected from the group consisting of argon, helium, and xenon.

5. The etchant gas composition according to Claim 1, wherein the carrier gas is argon.

6. An etchant gas composition, consisting essentially of:
a carrier gas;
one or more $C_{2+}F$ gases;
CH_2F_2; and
CHF_3.

7. The etchant gas composition according to Claim 6, wherein the one or more $C_{2+}F$ gases comprises C_4F_8.

8. The etchant gas composition according to Claim 6, wherein the one or more $C_{2+}F$ gases is C_4F_8.

9. The etchant gas composition according to Claim 6, wherein the carrier gas is selected from the group consisting of argon, helium, and xenon.

10. The etchant gas composition according to Claim 6, wherein the carrier gas is argon.

11. An etchant gas composition, consisting essentially of:

a carrier gas;

one or more $C_{2+}F$ gases;

CH_2F_2; and

CF_4.

12. The etchant gas composition according to Claim 11, wherein the one or more $C_{2+}F$ gases comprises C_4F_8.

13. The etchant gas composition according to Claim 11, wherein the one or more $C_{2+}F$ gases is C_4F_8.

14. The etchant gas composition according to Claim 11, wherein the carrier gas is selected from the group consisting of argon, helium, and xenon.

15. The etchant gas composition according to Claim 11, wherein the carrier gas is argon.

16. An etchant gas composition, consisting essentially of:

a carrier gas;

one or more $C_{2+}F$ gases;

CH_2F_2;

CHF_3; and

CF_4.

17. The etchant gas composition according to Claim 16, wherein the one or more $C_{2+}F$ gases comprises C_4F_8.

18. The etchant gas composition according to Claim 16, wherein the one or more $C_{2+}F$ gases is C_4F_8.

19. The etchant gas composition according to Claim 16, wherein the carrier gas is selected from the group consisting of argon, helium, and xenon.

20. The etchant gas composition according to Claim 16, wherein the carrier gas is argon.

21. An apparatus for etching insulating oxides, comprising:

a plasma reaction chamber containing an etchant gas comprising a carrier gas, one or more $C_{2+}F$ gases, CH_2F_2, and a gas selected from the group consisting of CHF_3, CF_4, and mixtures thereof.

22. The apparatus according to Claim 21, wherein the one or more $C_{2+}F$ gases comprises C_4F_8.

23. The apparatus according to Claim 21, wherein the one or more $C_{2+}F$ gases is C_4F_8.

24. The apparatus according to Claim 21, wherein the carrier gas is selected from the group consisting of argon, helium, and xenon.

25. The apparatus according to Claim 21, wherein the carrier gas is argon.

26. An apparatus for etching insulating oxides, comprising:

a plasma reaction chamber containing an etchant gas consisting essentially of a carrier gas, one or more $C_{2+}F$ gases, CH_2F_2, and CHF_3.

27. The apparatus according to Claim 26, wherein the one or more $C_{2+}F$ gases comprises C_4F_8.

28. The apparatus according to Claim 26, wherein the one or more $C_{2+}F$ gases is C_4F_8.

29. The apparatus according to Claim 26, wherein the carrier gas is selected from the group consisting of argon, helium, and xenon.

30. The apparatus according to Claim 26, wherein the carrier gas is argon.

31. An apparatus for etching insulating oxides, comprising:

a plasma reaction chamber containing an etchant gas consisting essentially of a carrier gas, one or more $C_{2+}F$ gases, CH_2F_2, and CF_4.

32. The apparatus according to Claim 31, wherein the one or more $C_{2+}F$ gases comprises C_4F_8.

33. The apparatus according to Claim 31, wherein the one or more $C_{2+}F$ gases is C_4F_8.

34. The apparatus according to Claim 31, wherein the carrier gas is selected from the group consisting of argon, helium, and xenon.

35. The apparatus according to Claim 31, wherein the carrier gas is argon.

36. An apparatus for etching insulating oxides, comprising:

a plasma reaction chamber containing an etchant gas consisting essentially of a carrier gas, one or more $C_{2+}F$ gases, CH_2F_2, CHF_3, and CF_4.

37. The apparatus according to Claim 36, wherein the one or more $C_{2+}F$ gases comprises C_4F_8.

38. The apparatus according to Claim 36, wherein the one or more $C_{2+}F$ gases is C_4F_8.

39. The apparatus according to Claim 36, wherein the carrier gas is selected from the group consisting of argon, helium, and xenon.

40. The apparatus according to Claim 36, wherein the carrier gas is argon.

41. A method for etching an insulating oxide layer on a substrate, comprising:

placing the substrate into a plasma reaction chamber;

introducing into the plasma reaction chamber an etchant gas comprising a carrier gas, one or more $C_{2+}F$ gases, CH_2F_2, and a gas selected from the group consisting of CHF_3, CF_4, and mixtures thereof; and

creating a plasma in the plasma reaction chamber.

42. The method according to Claim 41, wherein the etchant gas consists essentially of: a carrier gas; one or more $C_{2+}F$ gases; CH_2F_2; and CHF_3.

43. The method according to Claim 41, wherein the etchant gas consists essentially of: a carrier gas; one or more $C_{2+}F$ gases; CH_2F_2; and CF_4.

44. The method according to Claim 41, wherein the etchant gas consists essentially of: a carrier gas; one or more $C_{2+}F$ gases; CH_2F_2; CHF_3; and CF_4.

45. The method according to Claim 41, wherein the step of introducing into the plasma reaction chamber an etchant gas is performed using gas flow rates of 5 to 20 sccm for $C_{2+}F$ gases, 5 to 20 sccm for CH_2F_2, 10 to 30 sccm for CF_4, 20 to 50 sccm for CHF_3, and 70 to 200 sccm for the carrier gas.

46. The method according to Claim 41, wherein the one or more $C_{2+}F$ gases comprises C_4F_8.

47. The method according to Claim 41, wherein the one or more $C_{2+}F$ gases is C_4F_8.

48. The method according to Claim 41, wherein the carrier gas is selected from the group consisting of argon, helium, and xenon.

49. The method according to Claim 41, wherein the carrier gas is argon.

50. The method according to Claim 41, wherein the insulating oxide layer is doped silicon dioxide.

51. The method according to Claim 41, wherein the insulating oxide layer is borophosphosilicate glass, borosilicate glass, or phosphosilicate glass.

52. The method according to Claim 41, wherein the insulating oxide layer is a silicon dioxide having doping of about 3% or more for boron and about 3% or more for phosphorus.

53. A method for etching an insulating oxide layer on a substrate, comprising:

placing the substrate into a plasma reaction chamber;

introducing into the plasma reaction chamber an etchant gas comprising a carrier gas, one or more $C_{2+}F$ gases, CH_2F_2, and a gas selected from the group consisting of CHF_3, CF_4, and mixtures thereof; and

creating a plasma in the plasma reaction chamber at a power level of less than about 1000 W per 200 mm of substrate.

54. The method according to Claim 53, wherein the etchant gas consists essentially of: a carrier gas; one or more $C_{2+}F$ gases; CH_2F_2; and CHF_3.

55. The method according to Claim 53, wherein the etchant gas consists essentially of: a carrier gas; one or more $C_{2+}F$ gases; CH_2F_2; and CF_4.

56. The method according to Claim 53, wherein the etchant gas consists essentially of: a carrier gas; one or more $C_{2+}F$ gases; CH_2F_2; CHF_3; and CF_4.

57. The method according to Claim 53, wherein the step of introducing into the plasma reaction chamber an etchant gas is performed using gas flow rates of 5 to 20 sccm for $C_{2+}F$ gases, 5 to 20 sccm for CH_2F_2, 10 to 30 sccm for CF_4, 20 to 50 sccm for CHF_3, and 70 to 200 sccm for the carrier gas.

58. The method according to Claim 53, wherein the one or more $C_{2+}F$ gases comprises C_4F_8.

59. The method according to Claim 53, wherein the one or more $C_{2+}F$ gases is C_4F_8.

60. The method according to Claim 53, wherein the carrier gas is selected from the group consisting of argon, helium, and xenon.

61. The method according to Claim 53, wherein the carrier gas is argon.

62. The method according to Claim 53, wherein the insulating oxide layer is doped silicon dioxide.

63. The method according to Claim 53, wherein the insulating oxide layer is borophosphosilicate glass, borosilicate glass, or phosphosilicate glass.

64. The method according to Claim 53, wherein the insulating oxide layer is a silicon dioxide having doping of about 3% or more for boron and about 3% or more for phosphorus.